**S12 : CHEMICAL SCIENCE**

**Experiment 1: Testing Materials**

**Aim:**

1. To show that materials have a very large range of properties.
2. To show that there is a relationship between the properties of a material and how it is used.

**Theory:** We choose a material for a certain use on the basis of its properties. For example, we choose clay for bricks, aluminium for dinghies, glass for windows, tar for road surfaces and wool for jumpers. Choices are made about which material is used for which particular task using various criteria such as cost, availability, how suitable the material is for the task, what it will look like etc. The various properties of materials are the result of their chemical structure.

**Materials:**

* A range of materials to test Eg: metals, plastics, rubber, rock fibres, plasticine
* Hammer
* Block of wood with nail protruding
* Conductivity kit
* Testing plate
* 4x test tubes
* Safety glasses

**Safety**

1. Wear safety glasses and lab coat to protect your eyes and clothes
2. When burning or heating materials this should be conducted by in a fume cupboard in case toxic fumes are created.

**Procedure:**

1. For each material your are to conduct the following tests and record your results in the table provided.

**Hardness , brittleness, malleability.**

* Position the material to be tested on the testing plate (dissecting board). Lay the board on the ground or on the floor**. *Make sure that you have your safety glasses on.*** Tap the material with a hammer, gently at first then with steadily increasing force.
* Test for hardnes by observing whether the hammer marks the material
* Test for brittleness by observing whether the material breaks or cracks
* Test for malleability by observing whether it flattens out into a sheet.

**Electrical Conductivity**

* Use the conductivity kit to determine whether or not the material conducts electricity.

**Heat Resistance and Melting Temperature.**

* Heat the nail in the Bunsen burner flame and then press the tip sideways into the material to be tested. Observe whether the metal melts or chars the material or whether the action has no effect.

**Flexibility**

* Attempt to bend the material to see whether or not it is flexible***. (Make sure you are wearing your safety glasses)***

**Solubility.**

* Add a small piece of the material to water in a test tube. Shake the tube and allow it to stand for 5 mins. Observe whether or not the material dissolves.

**RESULTS:**

You will need to think about how you are going to record your results. You could devise a scale for each test which allows you to rate each material for that test.

Eg flexibility 1 = not flexible

10 = very flexible

For electrical conductivity you could record the amount of amps which are conducted.

If you come up with a scale you are using make sure you write down what your scale is.

You can also use descriptive results where you write down what you observe.

**Discussion**

1. Complete the summary table for five of the materials tested.

**Conclusion**

Make sure that your conclusion answers both parts of the aim.